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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,184

07/15/2003

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NGB-35857

8698

116 7590 05/14/2009
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EXAMINER

OSELE, MARK A

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

05/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/620,184	Applicant(s) OZONO ET AL.	
	Examiner Mark A. Osele	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,6 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,6 and 9-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 5-6, 9-11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication 2001-118862 (Akira) in view of U.S. Patent 6,709,543 (Kurosawa) and either U.S. Patent Publication 2001/0029088 (Odajima et al.) or U.S. Patent Publication 2003/0070517 (Tsujimoto). Akira shows a method and apparatus for picking up a semiconductor chip, 3a, adhered to a sheet, 1, by using a pick up head, 4a, the apparatus comprising: a holding table for holding the sheet, 1, a sheet exfoliation mechanism, 8a, with a suction surface includes a plurality of grooves, 7a, and a boundary portion which partitions the adjacent grooves wherein the boundary portions are in the same flat plane as the suction surface and abutted against a lower surface of the sheet, 1, and support the sheet during vacuum-sucking through the suction surface to exfoliate the sheet from the semiconductor chip, 3a (See Fig. 3). Akira further shows that when the vacuum-sucking is performed, the sheet is in a flat plane abutted against the suction surface of the exfoliation mechanism. Akira fails to show the semiconductor chip to be bent.

Kurosawa teaches that it has become desirable to make semiconductor chips thin in order to fit into thin packages (column 2, lines 6-10) and that thin semiconductor

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chips are deformed together with the adhesive sheet when suction is applied to the sheet to exfoliate the sheet from the chip (column 2, lines 17-22, 30-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use thin semiconductor chips in the apparatus of Akira because Kurosawa teaches the demands of industry for thin chips. Furthermore, the thin chips of the references as combined would be deformed along with the adhesive sheet using only vacuum suction force during the exfoliation vacuum-sucking step of Akira as shown by Kurosawa.

Kurosawa also shows the conventional arrangement of a sheet exfoliation mechanism located beneath a sheet holding table and moving the sheet exfoliation mechanism upward to abut against the adhesive sheet (Figs. 18A, 19A, 20A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the sheet exfoliation mechanism of Akira beneath the sheet holding table because this conventional arrangement allows for movement of all portions of the sheet over the exfoliation mechanism to exfoliate all of the chips from the adhesive sheet.

Odajima et al. shows that tapes can be removed from a wafer with an angle either aligned with an edge of the chips (Fig. 5a) or aligned with the diagonal of the chips from a corner thereof (Fig. 5b). This diagonal angle is 45° respective to the side of the chips. Tsujimoto teaches that it is advantageous to peel adhesive tapes from the corners of chips to avoid breaking the chips (paragraphs 0009 and 0013). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the bent range in a direction with a predetermined angle of about 45 degrees with respect to the side of the chip of the references as combined because because Odajima

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et al. teaches that peeling tapes from chips at either a 45 degree angle or a 90 degree angle with respect to the side of a chip are functionally equivalent alternate expedients and Tsujimoto teaches that peeling a tape from a chip at a 45 degree angle with respect to the side of a chip lessens the chance of breaking a chip.

Regarding claim 9, Kurosawa further shows a plurality of different exfoliating tools for different types of semiconductor chips. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the exfoliating tools of the references as combined freely interchangeable on the exfoliation mechanism to make the apparatus flexible as different chips or adhesive sheets are used without requiring a completely different apparatus for each type of chip.

Regarding claim 16, Kurosawa shows the suction exfoliation tool to be on a shaft. Both Akira and Kurosawa show different exfoliation tools for different chips. It would have been obvious to one of ordinary skill in the art at the time of the invention to place the exfoliation tool of the references as combined on a shaft because this arrangement is shown by Kurosawa in the same field of endeavor. Furthermore, it would have been obvious to make the exfoliation tool replaceable so one apparatus can be modified for working on different size and shaped chips without requiring the expenditure of an additional apparatus.

3. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akira in view of Kurosawa and either Odajima or Tsujimoto as applied to claim 5 above, and further in view of Elliott et al. (6,032,997). The references as combined fail to show

the bottom of the suction grooves to have vacuum holes. Elliott et al. shows a vacuum chuck wherein the suction grooves each have a bottom surface and vacuum hole therein. It would have been obvious to one of ordinary skill in the art at the time of the invention to add bottom surfaces and a vacuum hole to the invention of the references as combined because Elliott et al. shows this design to be effective for vacuum chucks.

Regarding the limitation of a plurality of holes in each vacuum groove, the number of vacuum holes required would be determined by routine optimization.

Regarding the limitation that the suction grooves are linear, the suction grooves of Akira are linear in that they extend downward linearly from the surface.

Response to Arguments

4. Applicants' arguments filed January 30, 2009 have been fully considered but they are not persuasive.

Applicants argue that Akira requires chip rotation while Kurosawa requires thrust pins, therefore, the references do not show bending by vacuum force alone. Using thin chips as suggested by Kurosawa in the method of Akira, the chip would be bent by the vacuum force and exfoliated from the tape before moving the chip in the X direction or rotating the chip. The original exfoliation step would occur from the vacuum force alone. Additional delaminating procedures occur after the exfoliation step.

Applicants also argue that Kurosawa shows the chip and the tape bent in opposite directions by the vacuum force. A review of Figs. 27A and 28A of Kurosawa shows the chip and the tape to be bent by the vacuum force in the same direction from

a flat plane tangential to the highest points 24a which would be the flat plane both the chip and tape would take if no bending deformation were produced by vacuum forces.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Osele whose telephone number is 571-272-1235. The examiner can normally be reached on M-F 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark A Osele/
Primary Examiner, Art Unit 1791
May 11, 2009